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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,773	07/25/2003	Kouji Ooae	0152-0650P	1857

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EXAMINER	
DUONG, THOI V	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 04/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/626,773	OOAE ET AL.	
	Examiner	Art Unit	
	Thoi V. Duong	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) *3,14 and 15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-10,12,13,16 and 17* is/are rejected.

7)☒ Claim(s) *11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/831,740.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/25/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. This application appears to be a continuation of Application No. 09/831,740, filed May 14, 2001.

Election/Restrictions

2. Applicant's election without traverse of Species I, claims 2 and 16, in the reply filed on January 30, 2006 is acknowledged.

Accordingly, claims 3, 14 and 15 are withdrawn and claims 1, 2, 4-13, 16 and 17 are considered in this office action.

Drawings

3. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2, 4-9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tadashi et al. (Tadashi, JP 6-275801) in view of Onishi et al. (Onishi, US 5,583,673), Toshida et al. (Toshida, US 5,812,227) and Kubota et al. (Kubota, US 6,368,680 B1).

Re claim 1, as shown in Fig. 3, Tadashi discloses a method for controlling a liquid crystal display having disposed therein a polymer dispersed liquid crystal layer 73 (record medium) with a composition of a polymer and a liquid crystal (paragraphs 54 and 90), comprising steps of:

controlling temperature of said polymer dispersed liquid crystal layer formed a heating unit 64 by controlling current flowing through said heating unit (paragraphs 46-48, 61 and 73-76).

However, Tadashi does not disclose that the glass transition temperature (Tg) of said polymer used with said liquid crystal and the phase transition temperature (TNI) of said liquid crystal satisfies the condition of $-20 <= (Tg-TNI) <= 20$; said polymer is a thermoplastic resin so that the temperature said polymer dispersed liquid crystal layer is below a transition temperature where liquid crystal transfers between states of opaque and transparent, placing said polymer and said liquid crystal under phase separation; and the temperature of said polymer dispersed liquid crystal layer is controlled above said transition temperature by controlling current flowing through said heating unit, placing said polymer to solubilize said liquid crystal.

At first, Onishi discloses a liquid crystal display comprising a thermal-responsive PDLC comprising a polymer material having a glass transition temperature Tg from 80 degrees to 180 degrees C (col. 11, lines 38-40 and col. 18, lines 23-29) and a liquid crystal having a phase transition temperature TNI from 80 degrees to 120 degrees C (col. 23, lines 7-10). Accordingly, if Tg is 80 degrees C and TNI is 100 degrees C, Tg-TNI = -20 degrees C and if Tg is 100 degrees C and TNI is 80 degrees, Tg-TNI = 20 degrees; these meet the claimed range. Onishi further discloses that the temperature of said PDLC layer is subjected to a heat treatment at the temperature 60 degrees C to place said polymer and said liquid crystal under phase separation (col. 32, lines 3-12); accordingly, this temperature is below a transition temperature from 80 degrees to 120 degrees C where liquid crystal transfers between states of opaque (light-scattering) and transparent (col. 23, lines 7-36).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Tadashi for controlling a liquid crystal display having disposed therein a polymer dispersed liquid crystal layer with a composition of a polymer and a liquid crystal with the teaching of Onishi by having the glass transition temperature of the polymer and the phase transition temperature of the liquid crystal satisfy the condition of –20 <=(Tg-TNI)<= 20 degrees C in order to prevent heat resistance characteristics and display characteristics from deterioration due to certain thermal circumstances and to produce a uniformly-formed liquid crystal panel (col. 11, lines 45-50 and col. 23, lines 7-19).

Further, Toshida discloses a liquid crystal display device comprising a polymer material which may include known thermoplastic resins or thermosetting resins (col. 19, line 66 through col. 20, line 18).

Furthermore, as shown in Fig. 5, Kubota discloses a relationship between the polymerization temperature and the optical hysteresis, wherein the polymerization temperature is properly set higher than the phase separation temperature of the PDLC layer, placing the polymer to solubilize the liquid crystal, in order to minimize the optical hysteresis (col. 4, lines 53-58 and col. 10, line 45 through col. 11, line 4).

Thus, since the method of Tadashi for controlling a liquid crystal display having disposed therein a polymer dispersed liquid crystal layer with a composition of a polymer and a liquid crystal comprises controlling temperature of the polymer dispersed liquid crystal layer by controlling flowing through the heating unit, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Tadashi with the teachings of Toshida and Kubota by having the polymer formed of thermoplastic resin and controlling the temperature of said polymer dispersed liquid crystal layer above said transition temperature by controlling current flowing through said heating unit, placing said polymer to solubilize said liquid crystal in order to minimize the optical hysteresis (Toshida, col. 3, lines 5-11 and Kubota, col. 11, lines 51-56).

Re claim 2, as shown in Fig. 3 of Tadashi, said heating unit 64 is provided between a pair of electrodes 61 and 62, said polymer dispersed liquid crystal layer 73 is provided on one of said pair of electrodes 61.

Re claim 4, Omnishi discloses that said polymer is a thermosetting resin (col. 17, lines 64 through col. 18, lines 22), and the glass transition temperature (Tg) of said polymer used with said liquid crystal from 80 degrees to 180 degrees C (col. 11, lines 38-40 and col. 18, lines 23-29), which is close the phase transition temperature (TNI) of said liquid crystal from 80 degrees to 120 degrees C (col. 23, lines 7-10). Accordingly, if Tg is 80 degrees C and TNI is 100 degrees C, Tg-TNI = -20 degrees C and if Tg is 100 degrees C and TNI is 80 degrees, Tg-TNI = 20 degrees, which satisfies the condition of –20 degrees C <= (Tg-TNI) <= 20 degrees C. Meanwhile, Toshida discloses a liquid crystal display device comprising a polymer material which may include known thermoplastic resins or thermosetting resins as mentioned above (col. 19, line 66 through col. 20, line 18).

Re claims 5 and 6, Toshida discloses that the polymer is an acryl-based resin which is polymethyl methacrylate (col. 5, lines 14-22 and col. 19, line 66 through col. 20, line 18).

Re claim 7, Onishi discloses that the weight ratio of polymer and liquid crystal of said composition is 50:50 to 7:93, and more preferably, 30:70 to 10:90 (col. 22, lines 28-38), which is in the claimed range of 1:10 to 10:1,

wherein, re claim 8, the weight ratio 50:50 of polymer and liquid crystal of said composition is in the range of 1:2 to 3:1; and

wherein, re claim 9, the weight ratio 50:50 of polymer and liquid crystal of said composition is 1:1.

Re claim 12, as shown in Fig. 6 of Onishi, the liquid crystal display having matrix structure.

6. Claims 10, 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tadashi et al. (Tadashi, JP 6-275801) in view of Onishi et al. (Onishi, US 5,583,673), Toshida et al. (Toshida, US 5,812,227) and Kubota et al. (Kubota, US 6,368,680 B1) as applied to claims 1, 2, 4-9 and 12 above, and further in view of Kessler et al. (Kessler, US 3,637,291).

The LCD device of Tadashi as modified in view of Onishi, Toshida and Kubota above includes all that is recited in claims 10, 13 and 16 except for a thermal conduction member, a color background plate having a color different from that of said polymer dispersed liquid crystal layer, the heating unit formed of a plurality of different resistance values, and a power circuit coupled to said pair of electrodes connected to the opposite ends of said heating unit having a variable resistor.

Re claim 16, as shown in Figs. 1 and 4, Kessler discloses a LCD comprising encapsuled liquid crystal layer 21 (col. 2, line 71 through col. 3, line 17) and a heating unit comprising a plurality of heating elements 17, 30, 31,...N of different resistance values (col. 2, lines 43-59), and a power circuit coupled to a pair of electrodes 20 and 23 connected to the opposite ends (ground ends) of the heating unit has a variable resistor 16 (thermistor) as shown in Fig. 3 (col. 2, line 63 through col. 4, line 51).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Tadashi with the teaching of Kessler by providing a heating unit comprising a plurality of heating elements of

different resistance values in order to write the images into the medium by energizing selected heating elements, thereby raising the temperature of the liquid crystals immediately adjacent to the selected heating elements above their clear point (col. 2, lines 17-21).

Re claim 10, as shown in Figs. 2 and 3, Kessler further discloses a thermal conduction member 11 (heat stabilizer unit) provided under the liquid crystal layer 21 (col. 3, line 39 through col. 4, line 15).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Tadashi with the teaching of Kessler by providing a thermal conduction member provided under the liquid crystal layer in order to establish a reference temperature for holding the entire liquid crystal layer at a constant temperature in operation (col. 3, lines 47-62).

Re claim 13, as shown in Fig. 2, Kessler further discloses a surface 20a of a field electrode 20 provided under the liquid crystal layer 21 and being oxidized for the purpose of providing a dark background (col. 2, lines 67-70). Accordingly, the dark oxidized surface 20a is a colored background plate having a color different from that of the liquid crystal layer which remains translucent upon cooling (col. 2, lines 11-26).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Tadashi with the teaching of Kessler by providing a colored background plate in order to accentuate the display (col. 2, lines 21-26).

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tadashi et al. (Tadashi, JP 6-275801) in view of Onishi et al. (Onishi, US 5,583,673), Toshida et al. (Toshida, US 5,812,227) and Kubota et al. (Kubota, US 6,368,680 B1) as applied to claims 1, 2, 4-9 and 12 above, and further in view of Larson et al. (Larson, US 6,278,430 B1).

The LCD of Tadashi as modified in view of Onishi, Toshida and Kubota above includes all that is recited in claim 17 except for forming heating body of a plastic sheet that has a conductive metal formed and etched in a wave form.

As shown in Figs. 1 and 3, Larson discloses a display device comprising a heating unit 2 (flexible plastic film) formed of a plastic sheet that has a conductive metal 3 (resistors) formed and etched in a wave form (spiral-like form or zigzag path) in each squared-shaped area (pixel) as shown in Figs. 6 and 7 (col. 3, lines 50-62, col. 5, lines 51-67 and col. 6, lines 37-38).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the LCD of Tadashi with the teaching of Larson by forming a heating body of a plastic sheet that has a conductive metal formed and etched in a wave form in order to obtain uniform temperature for the pixel area (col. 6, lines 9-16).

Allowable Subject Matter

8. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: none of the prior art of record fairly suggests or shows all of the limitations as claimed.

Specifically, none of the prior art of record discloses, in combination with other limitations as claimed, a method for controlling a liquid crystal display having disposed therein a polymer dispersed liquid crystal layer, wherein a thermal conduction member having a lattice shape is provided under said polymer dispersed liquid crystal layer.

The most relevant reference, US 3,637,291 to Kessler et al. (Kessler), fails to disclose or suggest a thermal conduction member having a lattice shape. As shown in Figs. 2 and 3, Kessler only discloses a thermal conduction member 11 (heat stabilizer) is provided under the encapsulated liquid crystal layer 21 to hold the liquid crystal at a constant temperature (col. 3, lines 39-62). Kessler is silent about the shape of the thermal conduction member 11.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (571) 272-2293.

Thoi V. Duong 

04/16/2006